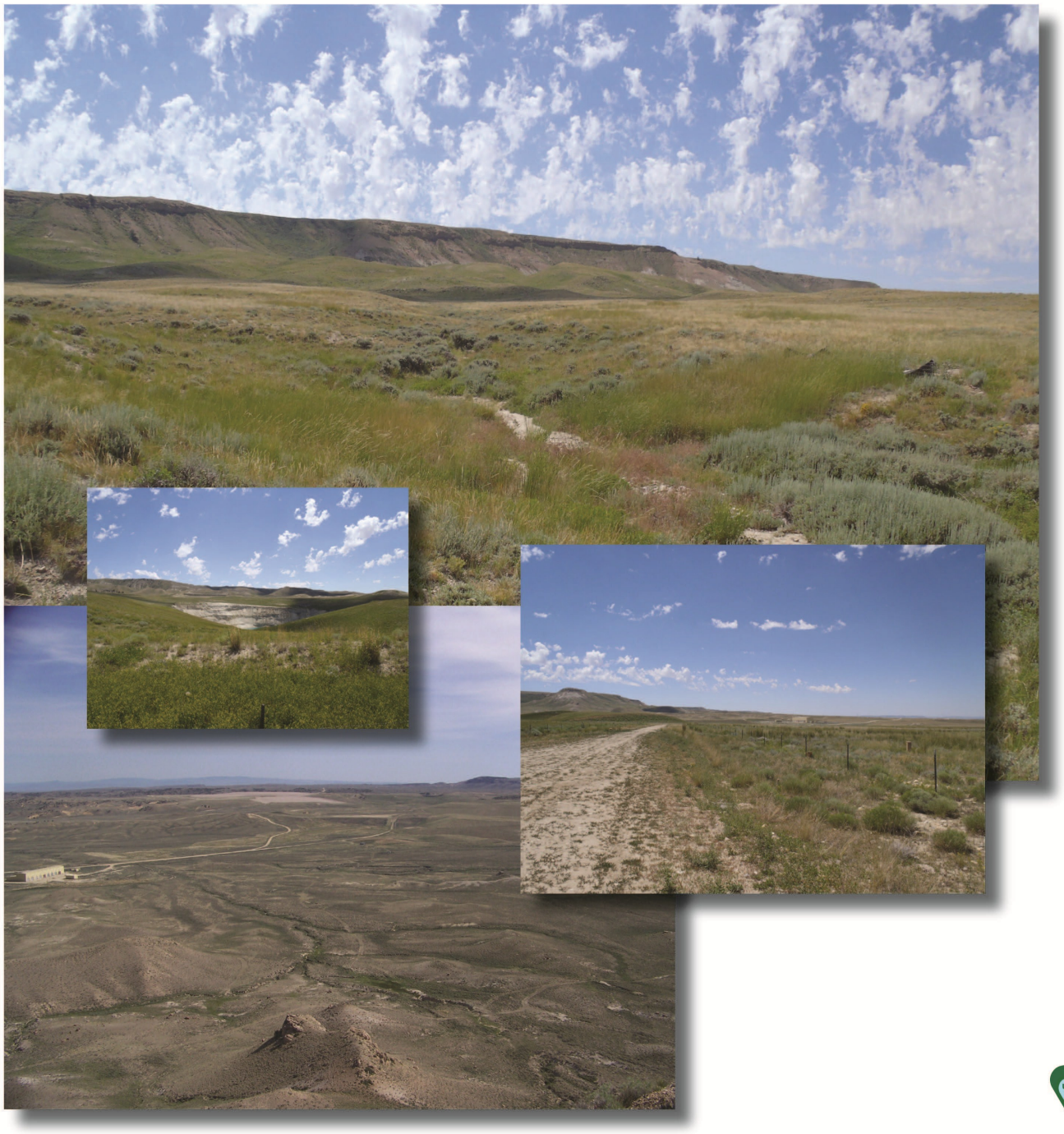
BLM

Final

Environmental Impact Statement for the Gas Hills In-Situ Recovery Uranium Project



Lander Field Office, Wind River/Bighorn Basin District, Wyoming

October 2013

BLM Mission Statement

The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

BLM/WY/PL-13/033+1330

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Wind River/Bighorn Basin District
Lander Field Office
1335 Main Street
Lander, Wyoming 82520

IN REPLY
REFER TO:

WYW140590
3809 (WYR05)

Dear Public Land User:

Enclosed is the Final Environmental Impact Statement (FEIS) for the Gas Hills In-situ Recovery (ISR) Uranium Project in Fremont and Natrona Counties, Wyoming. This EIS was prepared to analyze the potential impacts of a Plan of Operations submitted by Cameco Resources (also known as Power Resources Inc., a wholly owned subsidiary of Cameco US Holdings, Inc) to develop mining claims. The Gas Hills Project Area (GHPA) is located near the geographic center of Wyoming and encompasses approximately 8,500 acres within the Gas Hills Mining District.

This FEIS analyzes four alternatives in detail: the No Action Alternative, the Proposed Action Alternative, the Resource Protection Alternative, and the BLM Preferred Alternative. The FEIS also contains a discussion of other alternatives that were considered but eliminated from detailed analysis.

Under the Proposed Action, Cameco proposes the development of uranium deposits in the GHPA through implementation of the ISR process, which involves recovery of uranium from the subsurface through chemical dissolution using wells constructed in a manner similar to conventional water wells. The process requires installation of surface infrastructure (processing facilities, waste water disposal facilities, roads, header houses, and power lines) as well as subsurface infrastructure (wells, pipelines, electrical lines and communication cables). Maximum new surface disturbance under the Proposed Action would be approximately 1,315 acres, or 15% of the GHPA.

The BLM Preferred Alternative (BPA) would be similar to the Proposed Action in that it would involve ISR development of uranium deposits in the GHPA; however, the BPA would include several added features to reduce surface disturbance as well as increase and enhance reclamation success for the Project.

Copies of the Final EIS are available at the BLM Lander Field Office at the above address or at the following website:

http://www.blm.gov/wy/st/en/info/NEPA/documents/lfo/gashills.html

This FEIS is not a decision document. The publication of the Notice of Availability (NOA) in the *Federal Register* for this FEIS initiates a 30-day waiting period. Following conclusion of that period, BLM will prepare and sign the Record of Decision (ROD) to disclose the BLM's final decision on Cameco's application as described in the Plan of Operations and any project Conditions of Approval (COA). Availability of the ROD will be announced through local media, the project mailing list, and posted on the project website.

The FEIS was prepared pursuant to the National Environmental Policy Act (NEPA), the Federal Land Management Policy Act (FLPMA), and other regulations and statutes. The BLM prepared the FEIS in

consultation with cooperating agencies, taking into account public comments received to date. The Draft Environmental Impact Statement (DEIS) was published on November 16, 2012. A 45-day public comment period for the DEIS was held from November 16, 2012, to December 31, 2012, and then extended by the BLM to January 31, 2013, in response to requests from the public. A summary of the written comments received during the public review period for the DEIS and responses to the comments are provided in Appendix A of the FEIS.

If you wish to submit comments on this FEIS, we request that you make them as specific as possible, with references to page numbers and chapters of the document. Please refer to "Gas Hills ISR Project Comments" in your correspondence. Written comments will be accepted by fax, email, or letter for 30 days following the publication of the Notice of Availability in the *Federal Register* by the U.S. Environmental Protection Agency. All substantive comments will be reviewed and responded to in the ROD. Please provide your comments to:

Bureau of Land Management
Attn: Tom Sunderland
1335 Main Street
Lander, WY 82520-0589
Fax: 307-332-2318
Gas_Hills_Uranium_EIS_WY@BLM.gov

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you may ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. BLM will not consider anonymous comments. Comments, including names and street addresses of respondents, will be available for public review at the BLM Lander Field Office from 7:45 a.m. to 4:30 p.m. Monday through Friday, excluding federal holidays. Comments may be published as part of the NEPA document and other related documents. All submissions from organizations or businesses will be made available for public inspection in their entirety.

For further information concerning the document, please contact Tom Sunderland at (307) 332-8400.

Sincerely,

Richard Vander Voet

Richard Vander Voet
Field Manager
Lander Field Office

Gas Hills In-situ Recovery Uranium Project
***FINAL* ENVIRONMENTAL IMPACT STATEMENT (EIS)**

Project Name:	Gas Hills In-Situ Recovery Uranium Project ***Final*** Environmental Impact Statement
Lead Agency:	U.S. Department of the Interior Bureau of Land Management Lander Field Office Wind River/Bighorn Basin District, Wyoming
Project Location:	Fremont and Natrona Counties, Wyoming
Correspondence on this EIS	Bureau of Land Management Lander Field Office Attn: ***Tom Sunderland*** 1335 Main Street Lander, WY 82520 Fax: 307-332-8444 Email: Gas_Hills_Uranium_EIS_WY@blm.gov
Date by which Comments Must be Postmarked to BLM:	Within ***30*** days of the date of the Notice of Availability published in the *Federal Register*

ABSTRACT

Power Resources Inc., a wholly owned subsidiary of Cameco US Holdings Inc., doing business as Cameco Resources (Cameco) proposes to extract uranium from existing mining claims within the 8,500-acre Gas Hills Project Area (GHPA) located in eastern Fremont and western Natrona Counties, Wyoming. Cameco's proposed Gas Hills In-Situ Recovery Uranium Project (Project) would use in-situ recovery methods to remove uranium from the subsurface through chemical dissolution using a series of wells similar to water wells. The Project would be located within the Gas Hills Mining District, an area of historic mining dating back to the early 1950s, and would include the following phases; infrastructure development, mine unit construction, mine unit operation, aquifer restoration, and final Project reclamation and decommissioning. Five mine units, constructed ***in sequence*****,** are proposed for the Project, and would disturb approximately 1,315 acres during construction, 633 of which would remain disturbed during mine unit operation. After completion of uranium production all Project facilities would be decommissioned and all surface disturbance would be reclaimed by the end of the estimated 25-year life of the Project.

A final description of the Approved Project will be provided in the Record of Decision. Four alternatives were analyzed in detail in this ***Final*** EIS. They are: the No Action Alternative, the Proposed Action Alternative, the Resource Protection Alternative***, and the BLM-Preferred Alternative***. Under the No Action Alternative, the BLM would not approve Cameco's Project and none of the proposed uranium mining or associated activities would occur within the GHPA. Cameco would be responsible for the removal and reclamation of the existing Carol Shop facility and a portion of the existing roads within the GHPA. Exploration drilling would continue under the No Action Alternative. The Proposed Action Alternative would consist of Cameco's proposed Project for development within the GHPA. The Resource Protection Alternative would consist of Cameco's proposed Project with modifications to reduce the environmental impact of the Project. ***The BLM-Preferred Alternative includes modifications of the Proposed Action based on public and Agency comments on the Draft EIS.*** In addition to Cameco's commitment to voluntarily apply the applicant-committed environmental protection measures listed in this document, mitigation is recommended by the BLM that would lessen the environmental effects of the Project.

Written comments on the ***Final*** EIS will be accepted by the Lander Field Office of the BLM throughout a ***30***-day ***availability*** period beginning on the date the United States Environmental Protection Agency publishes a Notice of Availability for this EIS.

Responsible Official for *Final* EIS: Richard Vander Voet

Executive Summary

Power Resources Inc., a wholly owned subsidiary of Cameco US Holdings, Inc. doing business as Cameco Resources (Cameco) in the State of Wyoming, submitted a Plan of Operations (PoO) to the Bureau of Land Management (BLM) Lander Field Office (FO) for the proposed Gas Hills In-situ Recovery (ISR) Uranium Project (Gas Hills Project or Project) in central Wyoming. The Gas Hills Project is located near the geographical center of Wyoming within the Gas Hills Mining District, an area of historic uranium mining development which dates back to the 1950s (see **Figure 1-1**). Since the 1980s, activity in the Gas Hills Mining District has primarily been associated with mine and mill reclamation as well as ongoing uranium exploration. The Gas Hills Project would be operated as a satellite facility to Cameco's existing Smith Ranch-Highland Facility located in Converse County, Wyoming.

The Gas Hills Project Area (GHPA) is defined as the area encompassed by the mine permit boundary, which covers approximately 8,500 acres (approximately 13 square miles). While the GHPA contains federal surface and mineral estate under the jurisdiction of both the BLM Lander and BLM Casper FOs, the Lander FO is serving as the lead office for coordinating the environmental analysis. The Project is permitted by the Wyoming Department of Environmental Quality (WDEQ)-Land Quality Division (LQD) under Permit to Mine No. 687, and is licensed by the United States ***(U.S.)*** Nuclear Regulatory Commission under Source Materials License SUA-1548.

Purpose and Need

The purpose of the BLM action related to the Gas Hills Project is to respond to Cameco's request for approval of the PoO to extract uranium from existing mining claims initially staked during the 1950s under the General Mining Law of 1872 and since acquired and consolidated by Cameco.

The need for the BLM action is established by BLM's responsibility under the laws and regulations regarding the availability of all locatable minerals on federal lands, including uranium, as specified under the General Mining Law of 1872 as amended (30 U.S. Code [USC] §§ 22-54 and §§ 611-615), the original public land authority in 43 USC, §§ 2, 15, 1201, and 1457, Title 43 of the Code of Federal Regulations (CFR) in Groups 3700 and 3800, and the Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.). Under these laws, the BLM has the obligation to allow and encourage claim holders to develop their claims, subject to restrictions to ensure this development will not cause undue or unnecessary degradation of public lands.

Scoping

The BLM conducted public and internal scoping to solicit input and identify environmental issues and concerns associated with the proposed Project. The public scoping process was initiated on September 7, 2010, with the publication of a Notice of Intent (NOI) in the *Federal Register*. The BLM conducted scoping meetings in Casper, Riverton, Lander, and Jeffrey City using an open house format.

The BLM received a total of 21 comment submittals (e.g., letter or comment form) containing 215 individual comments during the public scoping period. Information gained during scoping assisted the BLM in identifying the potential environmental issues, alternatives, and mitigation measures associated with development of the Project. The process also provided a mechanism for narrowing the scope of issues so that analysis in the Environmental Impact Statement (EIS) could be focused on areas of high interest and concern. A majority of the comments were related to cumulative impacts, mitigation and monitoring, and potential impacts to range resources, water resources, and wildlife resources. There were also concerns and questions about the National Environmental Policy Act (NEPA) process and requests for additional public participation. The scoping period was closed on December 15, 2010.

The BLM conducted internal scoping to compile a list of resources potentially present in the Lander FO area to be considered in this EIS. Based on this list and public scoping, the following resources are discussed and analyzed in Chapters 3.0, 4.0, and 5.0 of this document:

- Air Quality;
- Cultural Resources and Native American Concerns;
- Geology;
- Land Use;
- Livestock Grazing;
- Paleontological Resources;
- Public Health and Safety;
- Recreation;
- Socioeconomics and Environmental Justice;
- Soils;
- Transportation;
- Vegetation Resources;
- Visual Resources;
- Water Resources;
- Wild Horses; and
- Wildlife and Fisheries Resources.

The BLM has determined that the proposed Project is in conformance with the BLM management plans and policies and is consistent with other federal and local land management plans and policies. As allowed under 36 CFR 800.8, the BLM has used the public comment process under NEPA to comply with the public consultation requirements of Section 106 of the National Historic Preservation Act.

Public Comment on the Draft EIS

The Draft EIS was distributed for a 45-day public review and comment period on November 16, 2012. The BLM extended the comment period until January 31, 2013, in response to requests from the public. Comments received during this period were reviewed, responses were developed, and the input was used to modify, clarify, and/or correct the Final EIS as appropriate. A summary of comments and responses received on the Draft EIS are included as Appendix A of the Final EIS.

Proposed Action and Alternatives

Chapter 2.0 of this EIS describes the GHPA boundaries, the existing and historic disturbances associated with uranium extraction present within the GHPA, and the proposed development alternatives, including a No Action Alternative, that are analyzed in this document. In developing the alternatives, the BLM followed guidance set forth in the BLM NEPA Handbook (H-1790-1), which provides for the development of a range of reasonable alternatives. Based on this guidance, the BLM developed the alternatives for analysis in this EIS described in the following paragraphs.

Approximately 1,300 acres, or 15 percent of the 8,500 acres within the permit boundary, has previously been disturbed by mining activities, primarily for uranium using surface mining methods, from the 1950s through the 1980s. Reclamation has led to the re-establishment of vegetation on about 900 acres of the

lands previously mined. Existing infrastructure consists of roads, utilities, and structures resulting in approximately 131 acres of disturbance. The existing Carol Shop facility, a large, multi-bay building that was used as a maintenance shop for historic uranium mining activities, would be re-used by Cameco for the proposed development. In addition, the existing gas service and overhead power lines to the GHPA would be used for future development.

No Action: Under the No Action Alternative, the proposed uranium ISR project and associated activities would not occur within the GHPA. Under this alternative, the Carol Shop facility would be removed and approximately 26.7 acres of disturbance would be reclaimed. If no other need for access roads were determined, 1.8 miles of road would be removed and approximately 10.9 acres (based on the current 50-foot disturbance width) would be reclaimed. Topsoil stored on approximately 2.6 acres would be redistributed on reclaimed areas. Exploration-related activities on BLM-managed lands would result in no more than 5 acres of unreclaimed surface disturbance at any time during the life of the NOI filed for each action under the 43 CFR 3809 surface management regulations. Reclamation of these sites would be anticipated to occur within the same calendar year as the disturbance. Under this alternative, a total of approximately 40.2 acres (less than 1 percent) within the GHPA would be reclaimed.

Analysis of the No Action Alternative is required under NEPA (43 CFR Section 1502.14[d]). The No Action Alternative may be selected by the BLM if the agency disapproves Cameco's PoO because the Project would cause undue or unnecessary degradation to resources managed by the agency (43 CFR, Section 3809.411[d][3][iii]).

Proposed Action: Cameco proposes the development of uranium deposits in the GHPA through implementation of the ISR process, which involves recovery of uranium from the subsurface through chemical dissolution using wells constructed similarly to conventional water wells. The process requires installation of surface infrastructure (processing facilities, waste water disposal facilities, roads, header houses, and power lines) as well as subsurface infrastructure (wells, pipelines, electrical lines, and communication cables). Activities associated with the Proposed Action would occur throughout the projected 25-year span of the Project, and would include the following phases:

1. **Infrastructure Development** – Construction or improvement activities occurring within the GHPA, but outside of mine units, including: upgrades to Project infrastructure within the GHPA (roads, electrical lines, water disposal, and pipelines); and construction or upgrades to processing facilities.
2. **Mine Unit Construction** – Construction activities occurring within mine units, including: delineation drilling; installation of injection, production and monitoring wells, pipelines, booster pump stations, header houses, and roads to header houses.
3. **Mine Unit Operation** – Operation of the ISR process to remove and process uranium; interim reclamation of the majority of the mine unit construction disturbance.
4. **Mine Unit Restoration and Reclamation** – Restoration of groundwater and decommissioning and removal of mine unit infrastructure, and final surface reclamation within each mine unit.
5. **Final Project Reclamation and Decommissioning** – Decommissioning and reclamation of surface and subsurface infrastructures within the GHPA but outside of the mine units, such as evaporation ponds, roads and satellite facilities.

Each of the ***5*** mine units to be developed under the Proposed Action would be completely disturbed during construction activities, although it is possible that small patches of vegetation may be left intact. Surface disturbance would be reduced during mine unit operations due to interim reclamation of construction disturbance. The ***5*** mine units would be developed over the first 15 years of the Project life. The surface disturbance associated with facilities within the GHPA outside of mine unit boundaries, such as evaporation ponds, wastewater deep disposal wells, or mineral processing and water treatment facilities, would remain for the projected 25-year life of the Project. At the end of the Project, all of these facilities would be decommissioned or removed and disturbed areas would be reclaimed.

The total estimated construction disturbance for the Project is 1,315 acres, or approximately 15 percent of the GHPA. The surface disturbance for the Project during operations is estimated to be 633 acres, or approximately 7 percent of the GHPA.

Resource Protection Alternative: The Resource Protection Alternative (RPA), developed to respond to public and agency input, is similar to the Proposed Action in that it would involve the development of uranium deposits in the GHPA through implementation of the ISR process. The RPA would utilize the same processes and take place over the same time period as the Proposed Action but with several added features designed to reduce surface disturbance; travel to and from the GHPA; and impacts to soils, vegetation, and wildlife; as well as increase and enhance reclamation of the Project:

- **Annual Development Planning:** Surface disturbance and potential for soil compaction and erosion associated with construction in each mine unit would be reduced, and the potential for successful reclamation would be increased through submittal of an Annual Development Plan (ADP) to the BLM that would require delineation of specific areas to be disturbed along with procedures to ensure that actual disturbance remains within planned areas (Section ***2.4.1).***
- **Construction Timing Constraints:** The BLM would not allow ***installation*** of ***any part of the third mine unit*** until interim reclamation on ***at least 1 well field in the first mine unit constructed*** has ***achieved*** reclamation success criteria. Likewise, ***installation of well fields within the fourth mine unit to be constructed*** would not begin until interim reclamation ***on at least 1 well field within the second mine unit constructed*** is successful, and construction would not begin ***on well fields within the final mine unit*** until interim reclamation ***on at least 1 well field within the third mine unit constructed*** has been demonstrated to be successful (Section ***2.4.2)***.
- **Closed Loop Drilling System:** Excavated drilling mud pits would be eliminated and replaced with closed loop systems for the management of drilling fluids (Section ***2.4.3).***
- **Disturbance Offset for Additional Satellite Facility:** Disturbance associated with construction and operation of a second satellite facility would be offset through a requirement for reclamation of an equal area of existing unreclaimed or poorly reclaimed disturbance within the GHPA (Section ***2.4.4)***.
- **Additional On-site Processing:** Additional on-site processing would produce yellowcake slurry ***from resin*****,** which would require fewer truck loads of ***uranium*** product to the Smith Ranch-Highland facility ***than would occur under the Proposed Action*** (Section ***2.4.5).***
- **Reclamation Goals and Timing:** Reclamation improvements would be realized through the use of rigorous reclamation goals and criteria ***based on requirements in the Lander Proposed RMP and Final EIS (BLM 2013),*** and by timely implementation of reclamation activities after completion of construction or operational activities (Section ***2.4.6).***
- **Burial of New Power Lines:** Impacts to wildlife would be reduced by burial of all new power lines (Section ***2.4.7).***

The total estimated construction disturbance for the RPA is ***818*** acres, or approximately 9 percent of the GHPA, which represents a 40 percent reduction in surface disturbance relative to the Proposed Action. The total estimated operational disturbance for the RPA is ***317*** acres (approximately 3 percent of the GHPA), a more than 50 percent reduction in disturbance relative to the Proposed Action.

BLM-Preferred Alternative: The BLM-Preferred Alternative (BPA) was developed in response to comments received on the Draft EIS during the public review process. This alternative would consist of Cameco's PoO with several additional elements derived from the Resource Protection Alternative. The BPA would utilize the same processes and take place over the same period of time as the Proposed Action; however, the RPA elements included in this alternative have been revised to reflect public and agency input during the review of the Draft document. The description of how resource protection measures would be incorporated into Cameco's

operations also is expanded. The following additions to the Proposed Action would be implemented under this alternative to reduce the adverse impacts from surface disturbance, increase the potential for reclamation success, and protect wildlife, soils, and vegetation.

- ***Annual Development Planning and Reporting: The BLM would require submittal of an ADP by Cameco, and approval of the ADP by BLM prior to initiating surface disturbance activities for each calendar year, including infrastructure development, mine unit construction, mine unit restoration and reclamation, or final project reclamation and decommissioning. This Plan would be included with Cameco's annual reporting requirements to the BLM, and would be in addition to information required for yearly submittal to WDEQ-LQD. The ADP would include:***
  - ***a. Designation of a Reclamation Coordinator: Among other duties assigned by Cameco, Cameco's reclamation coordinator would provide oversight for site-specific reclamation and topsoil handling activities.***
  - ***b. Site-specific Reclamation Plans: Cameco would submit to BLM a detailed reclamation plan for each year's planed construction disturbance in compliance with the Wyoming BLM Reclamation Policy (Appendix F). This plan would include well field level topsoil handling plans based on site-specific conditions within each planned disturbance area, determined by soil and vegetation characteristics, prior to commencing well field installation. Well field level information for each development would be used to develop plans specific to each mine unit. Information would be gathered during pre-site investigations and delineation drilling, then submitted to BLM during the annual development planning and reporting.***
  - ***c. Reclamation Success Criteria: Cameco would provide documentation of interim or final reclamation success based on standards listed in Appendix D of the Lander Proposed Resource Management Plan and Final EIS.***
  - ***d. Use of Existing Access Roads: Cameco would be required under this alternative to make use of existing access roads, where applicable, to access mine units and facilities.***
- ***Construction Timing Constraints: BLM would not authorize well field installation within the third mine unit to be constructed until interim reclamation on at least 1 well field in the first mine unit to be constructed is successful, and other well fields show significant progress towards meeting interim reclamation success described under Annual Development Planning and Reporting.***
- ***Additional On-site Processing: Additional on-site processing could be utilized to produce yellowcake slurry instead of resin beads for shipment to the Smith Ranch-Highlands facility. This portion of the BPA would be available as an option to Cameco under this alternative.***

The estimated maximum construction disturbance for the BPA is up to 1,315 acres, or approximately 15 percent of the GHPA. BLM anticipates a reduction of the area and intensity of impact through implementation of the additional measures listed for the BPA; however, the maximum impact has been disclosed for the purposes of analyses. The surface disturbance of the BPA during operations is estimated to be 633 acres, or approximately 7 percent of the GHPA.

Alternatives Considered but Eliminated from Detailed Analysis: The BLM considered ***6*** alternatives that were eliminated from detailed impact analysis in this EIS ***(see Section 2.6 for additional description)***. Conventional mining, either open pit or underground methods, were not analyzed in detail because of a greater disturbance footprint and potential for impacts to groundwater, surface water, vegetation, soils, and wildlife relative to ISR methods. Seasonal operation of the ISR system was not further considered because the process cannot be shut down for short periods of time due to the need to maintain constant control of groundwater gradients. The BLM ***determined an alternative*** prohibit***ing*** a

temporary closure of the facility ***was unnecessary due to*** existing regulations. Alternate transportation routes to the Smith Ranch/Highland facility were not analyzed because the routes were not designed for frequent heavy vehicle use and are not maintained in winter. ***A***lternate waste disposal locations were not considered in the analysis because transportation of waste represents a small portion of Project-related traffic. ***Finally, a reduced number of evaporation ponds and the use of deep disposal wells as the primary method for wastewater disposal was not analyzed in favor of conservatively analyzing impacts associated with maximum number of evaporation ponds and deep disposal wells in this document.***

Affected Environment

Chapter 3.0 of the EIS describes the affected environment of the GHPA for each of the resources identified during internal scoping and listed above. These resources are present within the GHPA and provide the basis to address substantive issues of concern brought forward during internal and public scoping. The information presented in Chapter 3.0 provides quantitative data and spatial information where appropriate to the resource that serves as a baseline for comparison of the direct, indirect, and cumulative impacts of each of the alternatives.

Environmental Consequences

Chapter 4.0 of the EIS describes the environmental effects of implementing the alternatives on the affected environment as described in Chapter 3.0. The chapter is divided into subsections addressing the specific incremental impacts for each of the resources identified during internal scoping listed above. The impact analysis for each resource was focused on the new disturbance over and above the existing disturbance in the GHPA. For each of the action alternatives (Proposed Action***,*** the RPA***, and the BPA***), the new disturbance is over and above the existing disturbance ***described under*** the No Action Alternative. The resource-specific effects of the alternatives are evaluated quantitatively and qualitatively, as appropriate, based on available data and the nature of the resource analyzed. A comparison of disturbance within the GHPA associated with the alternatives is provided in **Table 2-*6*** of the ***Final*** EIS. A summary of the Chapter 4.0 impact analyses is provided in **Table 2-*7*** of the ***Final*** EIS.

Cumulative Impacts

Cumulative impacts from past ***and*** present ***actions*** and reasonably foreseeable development are presented in Chapter 5.0 of the EIS. For each resource, the Cumulative Impact Study Area (CISA) was developed appropriate to the geographical extent of anticipated cumulative impacts. For some resources (e.g., cultural resources and Native American traditional values, geology, paleontology, soils, and vegetation), the CISA is the same as the GHPA. For other resources (e.g., socioeconomics and air quality), the CISA includes a larger area within which cumulative impacts could occur.

Projects considered in the cumulative impact analysis include the following:

- Past disturbance associated with historic uranium mining activities;
- Existing disturbance from ongoing projects associated with mineral exploration, mining, reclamation of historic mining activity under the Wyoming Abandoned Mine Lands program, oil and gas development, and long-term management of uranium tailings under the Department of Energy Legacy Management program; and
- Future disturbance from proposed Project activities associated with Cameco's proposed ISR development, reclamation of historic mining activity under the Wyoming Abandoned Mine Lands program, and potential road construction and relocation by Fremont County.

The Proposed Action would represent approximately 70 percent of the cumulative surface disturbance within the GHPA associated with existing and reasonably foreseeable development. Similarly, the RPA would represent approximately 58 percent of the cumulative disturbance within the GHPA. The Proposed Action represents about 42 percent of the surface disturbance identified for all planned projects within

the vicinity of the GHPA. In general, the cumulative impacts from past ***and*** present ***actions*** and reasonably foreseeable development are similar in character and magnitude to those for the proposed Project and alternatives.

List of Acronyms

°F	degree Fahrenheit
µg/m^3	micrograms per cubic meter
ACEC	Areas of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACM	Applicant-committed Measures
ADP	Annual Development Plan
AEA	Atomic Energy Act of 1954
AEC	Atomic Energy Commission
AECOM	AECOM Technical Services, Inc.
AIRFA	American Indian Religious Freedom Act of 1978
AML	abandoned mine lands
amsl	above mean sea level
AO	Authorized Officer
APE	Area of Potential Effect
APHIS	Animal and Plant Health Inspection Service
APLIC	Avian Power Line Interaction Committee
AQRV	Air Quality Related Values
ARPA	Archaeological Resources Protection Act
AUM	animal unit month
B.P.	before present
BEA	Bureau of Economic Analysis
bgs	below ground surface
BLM	Bureau of Land Management
BMP	Best Management Practice
BPA	BLM-Preferred Alternative
BPT	Best Practicable Technology
Btu/hr	British thermal units per hour
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
Cameco	Power Resources Inc., Cameco US Holdings, Inc. (dba Cameco Resources)
CBNG	coal-bed natural gas
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act

CFR	Code of Federal Regulations
cfs	cubic feet per second
CISA	Cumulative Impact Study Areas
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COMA	Comparison Area
CR	County Road
CWA	Clean Water Act
cy	cubic yards
dB	decibel
dB(a)	decibels on an A-weighted scale
DDA	designated development area
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESD	ecological site description
FLPMA	Federal Land Policy and Management Act
FO	Field Office
Gas Hills Project or Project	Gas Hills In-situ Recovery Uranium Mine Project
GHG	greenhouse gases
GHPA	Gas Hills Project Area
GIS	Geographic Information System
gpm	gallons per minute
GPS	Global Positioning System
H_2O_2	Hydrogen peroxide
H_2SO_4	Sulfuric Acid
HAP	hazardous air pollutant
HMA	Herd Management Area
HMMH	Harris, Miller, Miller, and Hanson
HUC	Hydrologic Unit Code
HWA	Hayden-Wing Associates
IM	Instruction Memorandum

IPCC	Intergovernmental Panel on Climate Change
IR	isolated resource
ISR	In-situ Recovery
km	kilometer
KOP	Key Observation Point
kV	Kilovolts
LM	Office of Legacy Management
LRP	Limited Reclamation Potential
LTA	Larson-Tibesar Associates
LTSP	Long-term Surveillance Plan
Ma	million years ago
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
$miles^2$	square miles
MLRA	Major Land Resource Area
MOU	Memorandum of Understanding
mph	miles per hour
mrem	millirem
mrem/yr	millirem per year
N_2O	nitrous oxide
Na_2CO_3	Sodium carbonate
NAAQS	National Ambient Air Quality Standards
NaCl	Sodium chloride
NAGPRA	Native American Graves Protection and Repatriation Act
$NaHCO_3$	Sodium bicarbonate
NaOH	Sodium hydroxide
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966, as amended
NO_2	nitrogen dioxide
NOI	Notice of Intent
NO_X	oxides of nitrogen
NPS	National Park Service
NRHP	National Register of Historic Places
NSO	No Surface Occupancy
NWS	National Weather Service
O_2	Liquid oxygen

O_3	ozone
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
P.L.	Public Law
PA	Programmatic Agreement
PAS	Pronghorn Archaeological Services
Pb	lead
pCi	picocuries
pCi/L	picocuries per liter
PFYC	Potential Fossil Yield Classification
PIF	Partners in Flight
PLS	Pure Live Seed
PM	Particulate Matter
PM_{10}	Particulate Matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter of 2.5 microns or less
PoO	Plan of Operations
ppm	parts per million
PRB	Power River Basin
PRI	Power Resources Inc.
PRPA	Paleontological Resources Preservation Act of 2009
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
rem	roentgen equivalent man
RFFA	reasonably foreseeable future action
RMP	Resource Management Plan
RO	reverse osmosis
ROD	Record of Decision
ROW	right-of-way
RPA	Resource Protection Alternative
s.u.	standard unit
SARA	Superfund Amendment and Reauthorization Act
SCP	Spill Contingency Plan
SGEO	Sage-grouse Executive Order
SHEQ	Safety, Health, and Environmental Quality
SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan

SO_2	sulfur dioxide
SO_4	sulfuric acid
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SSURGO	Soil Survey Geographic Database
SWPPP	Storm Water Pollution Prevention Plan
TCP	Traditional Cultural Properties
TDS	total dissolved solids
TLSTMDL	Total Maximum Daily Load Timing Limitation Stipulations
TMP	Topsoil Management Plan
tpy	tons per year
TVA	Tennessee Valley Authority
U.S.	United States
U.S. NRC	United States Nuclear Regulatory Commission
U_3O_8	uranium oxide
UIC	Underground Injection Control
UMTRCA	Uranium Mill Tailings Radiation Control Act of 1978
UPZ	Uranium Point Zone
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDA-NRCS	United States Department of Agriculture-Nature Resource Conservation Service
USDOI	United States Department of the Interior
USDOT	United States Department of Transportation
USDW	Underground Source of Drinking Water
USEPA	United States Environmental Protection Agency
USFS	United States Department of Agriculture, Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds
VRM	Visual Resource Management
WAAQS	Wyoming Ambient Air Quality Standards
WCC	West Canyon Creek
WDA	Wyoming Department of Agriculture
WDEQ	Wyoming Department of Environmental Quality
WDEQ-AQD	Wyoming Department of Environmental Quality-Air Quality Division
WDEQ-LQD	Wyoming Department of Environmental Quality-Land Quality Division

WDEQ-WQD	Wyoming Department of Environmental Quality-Water Quality Division
WDR	Wyoming Department of Revenue
WDWS	Wyoming Department of Workforce Services
WEAD	Wyoming Economic Analysis Division
WGFD	Wyoming Game and Fish Department
WNv	West Nile Virus
WOGCC	Wyoming Oil and Gas Conservation Commission
WOS*L*I	Wyoming Office of State Lands and Investments
WRCC	Western Region Climate Center
WSA	Wilderness Study Area
WSEO	Wyoming State Engineer's Office
WSGS	Wyoming State Geological Survey
WYDOT	Wyoming Department of Transportation
WYNDD	Wyoming Natural Diversity Database
WYPDES	Wyoming Pollutant Discharge Elimination System

Contents

List of Appendices

List of Tables

List of Figures